June 3, 2005

Water Docket
U.S. Environmental Protection Agency
Mailcode 4101T
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Attention: Docket ID No. OW-2004-0019

Re: National Mining Association Comments on the Environmental Protection Agency's Notice of Draft Aquatic Life Criteria Document for Selenium and Request for Scientific Information, Data, and Views, 69 Fed. Reg. 75,541 (Dec. 17, 2004)

The National Mining Association ("NMA") appreciates this opportunity to comment on the draft ambient water quality criteria ("AWQC") for selenium ("Se"). NMA is a trade association representing producers of most of America's coal, metals and industrial and agricultural minerals. Its membership also includes manufacturers of mining and mineral processing machinery and supplies, transporters, financial and engineering firms, and other businesses related to mining.

NMA members operate facilities located on or near waters of the United States and therefore require permits for any discharges into those waters pursuant to the Clean Water Act ("CWA") National Pollutant Discharge Elimination System ("NPDES"). The adoption of revised national Se criteria is important to NMA members that may operate facilities located on waters with elevated Se levels and/or find high Se concentrations in the ground water. Therefore, NMA members have a high degree of interest in any guidance to States that would improve upon the scientific validity of assessing selenium toxicity and how that risk is managed in the context of CWA regulatory programs.

NMA supports a fish tissue-based criterion as the most scientifically defensible and logical approach to managing risk from Se in aquatic systems. Over the past decade, development of new scientific data on the aquatic toxicity of selenium firmly establishes that the current water-based national selenium criteria are not supported by the science, are overly stringent and should be revised.

Over the past several years, EPA has given considerable thought to the unique toxicological aspects of selenium. Indeed, in 1998, the Agency sponsored a peer

consultation workshop on technical issues relating to selenium criteria and in 2002 prepared a *Draft Aquatic Life Water Quality Criteria for Selenium 2002,* EPA Contract No. 68-C6-0036 (March 2002 Draft) which received unanimous support from five EPA selected peer reviewers. See *Summary Report-Peer Review of 2002 Update Aquatic Life Water Quality Criteria for Selenium*, prepared by Versar, Inc. dated June 17, 2002.

There remain some uncertainties associated with derivation of the fish tissue-based criterion that may make the appropriateness of universal application of national criteria questionable. However, NMA strongly believes the scientific uncertainties will be resolved over time and should not delay final issuance of the 2004 Guidance. Accordingly, NMA urges EPA to revise the Guidance to provide maximum flexibility for States to address site-specific factors as they adopt these criteria for use in water quality standards development. In addition, NMA recommends any final chronic criterion should be recalculated, eliminating use of the Lemly study purporting winter stress, to arrive at a criterion that more accurately reflects the current consensus of the Se experts. In addition, EPA should continue development of the existing toxicity database, including further studies to either verify or dismiss the winter stress hypothesis.

NMA's general comments are summarized below; specific comments are expressed in a paper prepared by Parametrix on behalf of NMA and Kennecott Utah Copper Corporation. See *Comments on the Revised Draft AWQC for Selenium and on the Draft Manuscript Developed by Skorupa et al. (*Attachment 1).

General Comments:

Proposed Acute Criteria are Appropriate:

NMA supports the development of separate acute criteria for selenite and selenate, including the development of sulfate-normalized criteria for selenate. The proposed acute criteria reflect the current state of the science for acute selenite and selenate toxicity.

Proposed Chronic Criterion Is Highly Uncertain:

EPA proposes a freshwater chronic criterion as a concentration in whole-body fish tissue of 7.91 µg/g, dry weight (dw) with a requirement that if fish tissue samples exceed 5.85 µg/g dw during summer or fall, fish should be monitored during the winter to determine if selenium exceeds 7.91 µg/g dw. As discussed in our attached comments, this criterion and monitoring trigger were based on a single study (Lemly 1993) that evaluated the combined effects of a single selenium treatment (~5 µg/g in food, ~5 µg/L in water) and temperature (4°C) on juvenile bluegill sunfish (*Lepomis macrochirus*) mortality. The combined effects of selenium and cold temperatures were termed "winter stress syndrome." There is considerable uncertainty in this study because (1) no other studies have explicitly evaluated the winter stress syndrome endpoint; (2) no concentration-response data were available so it is unknown if the response was

anomalous; and (3) because no temperatures between 4 and 20°C were evaluated it is unknown how fish would have responded to less extreme temperature reductions.

In light of these uncertainties and considering additional selenium toxicity data for bluegill, NMA believes the appropriate range for a chronic criterion is between 10 and 11 µg/g dw. For example, the species mean chronic value (SMCV) for bluegill, as reported in the draft AWQC document, is 9.5 µg/g. This SMCV includes the chronic value of 7.91 µg/g. If the 7.91 µg/g value is excluded, the SMCV is revised to 10.5 µg/g. Further, if bluegill data excluded without reason in the draft AWQC document are included, the SMCV increases further to 11.5 µg/g. After bluegill, the next most sensitive species appear to be the flannelmouth sucker (*Catostomus latipinnis*) with a SMCV of >10.2 µg/g and cutthroat trout (*Oncorhynchus clarki*) with a SMCV of >11.4 µg/g. Consequently, the weight-of-evidence suggests the appropriate criterion lies between 10 and 11 µg/g. There is even conservatism in the flannelmouth sucker and cutthroat trout SMCVs because they selenium concentrations are reported as "greater than" values, i.e., no effects were observed at the reported concentrations.

Based on the above, we recommend that the chronic criterion be based on the lowest SMCV (i.e., >10.2 µg/g for flannelmouth sucker). Until the "winter stress" effect can be scientifically validated by repeating the Lemly study to independently confirm the results, including evaluation of additional Se levels and temperature regimes, EPA should reconsider whether universal, or nation-wide application of a criterion based on winter stress syndrome makes sense. This endpoint would **only** be relevant in water bodies where the water temperature drops significantly in the winter and stays that way for extended periods of time, an extremely unlikely scenario within the bluegill's native range.

<u>The Proposed Criterion Should Be Revised To Consider Background Se Levels and Species Acclimation:</u>

In addition to reconsidering the magnitude of the chronic criterion, the Agency must reconsider the appropriateness of applying any revised criterion nationally. In its current form, the Draft proposal fails to fully recognize that background Se concentrations exceed the proposed criterion of 7.9 µg/g dw in many streams, particularly in the western states. Appendix J of the Draft Document compares 7.91 µg/g dw to nationwide selenium concentrations (although it is not explicitly stated how "background" is defined). Overall, EPA concludes that only 1–3 percent of the measured selenium concentrations at background sites exceed 7.91 µg/g dw. However, it is not clearly noted (and should be) that the majority of background selenium concentrations included in Appendix J is from the eastern and southern U.S., not from the seleniferous regions of the western U.S.

The Draft must also be revised to address application of the national criterion where the genus used to derive the criterion, the common sunfish, is not available in the aquatic system. In such cases, EPA must incorporate alternative criteria that can be easily adopted. Simply stating that state and local variances are available is not adequate

as in many cases states and local municipalities do not have adequate resources to accomplish the necessary variance.

Finally, it should be recognized that species may have the ability to adapt to elevated selenium levels. For example, and as discussed further in our attached comments, Hardy (2003)[1] suggests that cutthroat trout have the ability to tolerate relatively high levels of selenium exposure by maintaining non-toxic body levels via an enhanced excretory mechanism. Given that whole body selenium concentration reached as high 11.37 μg/g dw in this study without adverse effects being observed questions the applicability of the draft tissue criterion of 7.91 µg/g dw to water bodies containing tolerant species or populations that have adapted to the elevated concentrations. There exist other examples in the western U.S. suggesting that the draft criterion may be overly conservative for certain water bodies. In the Republican River Basin located in Colorado, Nebraska, and Kansas, mean whole body fish selenium concentrations have exceeded the "trigger" criterion of 5.85 µg/g dw for nine species and the criterion of 7.91 µg/g dw for four species (including two species of sunfish) (May et al. 2001). May et al. plotted selenium concentrations versus individual fish weights, which suggested that successful reproduction was occurring despite high selenium levels being measured. The authors concluded that universal selenium guidelines may be inappropriate or may need refinement for certain systems.

These studies establish that populations may use several mechanisms to survive and reproduce successfully, even when Se levels exceed laboratory-derived chronic values. EPA should encourage states to recognize this adaptability or Se tolerance factor in environments where fish tissue levels of the relevant species exceed the revised criterion. EPA should include clear guidance to states that where evidence of adaptability exists, the national criterion should not apply.

Development of an Implementation Plan:

Development of implementation guidance is needed. Without such a plan, the adoption of the chronic criterion is unlikely by most states as they lack the expertise and resources to develop their own plan. However, lack of such a plan does not reduce the value or need to move forward with publishing the criteria document in final form. For some states (e.g., California) where Se is an important issue, the expertise and resources for developing an implementation plan are available and so the criteria document will be of great use in advancing the state of regulatory science. Other states may not have the expertise to implement the new chronic criterion without implementation guidance. As such, EPA should develop concise guidance on: 1) how criterion compliance is determined; and 2) how site-specific or region-specific considerations may be taken into account.

The Draft document recognizes there may be aquatic communities with fish assemblages containing species with different sensitivities to selenium compared to those

[1] A copy of Hardy (2003) is appended to these comments. The draft AWQC document cites the 2002 version of this report.

listed in Table 4 of the document. The document further states that results from appropriate site-specific studies could be used to modify the criterion. Given the abundance of seleniferous geologic formations in the western U.S., we feel that the document should address site-specific issues in a more transparent manner and provide further guidance on the types of studies that would be relevant for deriving an alternative fish tissue-based criterion.

Conclusion:

NMA appreciates this opportunity to provide comments on the Draft Selenium Aquatic Life Criterion. Please feel free to contact me should you have any questions about the enclosed information.

Respectfully submitted,

Karen Bennett
Director, Water Quality
National Mining Association